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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
PYZOCHA, MICHAEL J	

ART UNIT	PAPER NUMBER
2137	

DATE MAILED: 12/20/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/918,831	ROELSE, PETRUS LAMBERTUS ADRIANUS	
	Examiner	Art Unit	
	Michael Pyzocha	2137	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 October 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-8* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-8 are pending.

2. Amendment filed 10/03/2005 entered with a request for continued examination on 10/26/2005 has been received and considered.

Claim Rejections - 35 USC § 101

3. The rejections made under 35 U.S.C. 101 have been withdrawn based on the filed amendments.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1, 3-4, 7-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rijmen et al (The Cipher SHARK), further in view of Loureiro et al (Function Hiding Based on Error Correcting Codes) and further in view of Williams.

As per claims 1 and 7, Rijmen et al discloses a method of generating a linear transformation matrix A for use in a symmetric-key cipher, the method including: generating a binary (n,k,d) error-correcting code, represented by a generator matrix $\mathbf{G} \in Z_2^{k \times n}$ in a standard form $\mathbf{G} = (I_k \| B)$, with $B \in Z_2^{k \times (n-k)}$, where $k < n < 2k$, and d is the minimum distance of the binary error-correcting code (see page 4), and forming a nonsingular matrix with $2k-n$ columns (see page 5).

Rijmen et al fails to disclose extending matrix B, and deriving a matrix A from matrix C.

However, Loureiro et al teaches such an extension and derivation (see section 4.1).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to use Loureiro et al's extending and deriving in Rijmen et al's ciphering method.

Motivation to do so would have been to hide a function represented on a matrix format.

The modified Rijmen et al and Loureiro et al method fails to disclose shortening this code.

However, Williams discloses shortening error-correcting codes (see page 38).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to use Williams' method of shortening error-correcting codes to shorten the codes of the modified Rijmen et al and Loureiro et al method.

Motivation to do so would have been that shortening codes enhances flexibility (see Williams page 38).

As per claim 3, the modified Rijmen et al, Loureiro et al, and Williams method discloses the step of deriving matrix A from matrix C includes: determining two permutation matrices $P_1, P_2 \in Z_2^{kxk}$ such that all codewords in an $[2k,k,d]$ error-correcting code, represented by the generator matrix $(I \| P_1 C P_2)$, have a predetermined multi-bit weight; and using $P_1 C P_2$ as matrix A (see Rijmen et al page 5 and Loureiro et al section 4.1).

As per claim 4, the modified Rijmen et al, Loureiro et al, and Williams method discloses the cipher includes a round function with an S-box layer with S-boxes operating on m-bit sub-blocks, and the minimum predetermined multi-bit weight over all non-zero code words equals a predetermined m-bit weight (see Rijmen et al pages 5-6).

As per claim 8, the modified Rijmen et al, Loureiro et al, and Williams method discloses a system for cryptographically converting an input data block into an output data block; the

data blocks comprising n data bits; the system including: an input for receiving the input data block; a storage for storing a linear transformation matrix A, generated according to the method of claim 1, a cryptographic processor performing a linear transformation on the input data block or a derivative of the input data block using the linear transformation matrix A; and an output for outputting the processed input data block (see Rijmen et al as applied to claim 1 and Loureiro et al section 4.1).

1. Claims 2 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over the modified Rijmen et al, Loureiro et al, and Williams method as applied to claim 1 above, and further in view of FOLDOC.

As per claim 2, the modified Rijmen et al, Loureiro et al, and Williams method discloses the step of extending matrix B with $2k-n$ columns includes randomly generating $2k-n$ columns, each with k binary elements, and forming a test matrix consisting of the $n-k$ columns of B and the $2k-n$ generating columns (see Loureiro et al section 4.1) and using the nonsingular matrix as matrix C (see Rijmen et al page 5).

The modified Rijmen et al, Loureiro et al, and Williams method fails to disclose this process being done iteratively and

checking whether the test matrix is nonsingular, and repeating until a nonsingular test matrix has been found.

However, FOLDOC discloses a method of brute force to find something (see page 1).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to use FOLDOC's method of brute force to find the nonsingular matrix of the modified Rijmen et al, Loureiro et al, and Williams method.

Motivation to do so would have been to be able to find every solution (see FOLDOC page 1).

As per claim 5, the modified Rijmen et al, Loureiro et al, Williams and FOLDOC method discloses the step of determining the two permutation matrices P_1 and P_2 includes iteratively generating the matrices in a random manner (see Loureiro et al section 4.1).

6. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over the modified Rijmen et al, Loureiro et al, and Williams method as applied to claim 1 above, and further in view of Isaka et al.

As per claim 6, the modified Rijmen et al and Loureiro et al method fails to disclose the cipher includes a round function operating on 32-bit blocks and wherein the step of generating a

[n,k,d] error-correcting code includes: generating a binary extended Bose-Chaudhuri-Hocquenghem (XRCH) [64,36,12] code;

However, Isaka et al teaches such an XRCH code (see page 3).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to use Isaka et al's XRCH code as the error-correcting code of the modified Rijmen et al and Loureiro et al method.

Motivation to do so would have been that these codes achieve unequal error protection (see Isaka et al abstract page 1).

Response to Arguments

Applicant's arguments filed 10/03/2005 have been fully considered but they are not persuasive. Applicant argues: the addition of the Williams reference to the combination of Rijmen, Loureiro, and Isaka lacks motivation because Examiner used impermissible hindsight.

In response to Applicant's argument that the Examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account

only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

Furthermore Williams teaches the motivation to shorten a code to enhance flexibility (see page 38). This flexibility is to be able to provide a wide range of code rates and block sizes as discussed on page 38. The Rijmen and Loureiro references relate to block ciphers and error correcting codes. Therefore one of ordinary skill in the art of block ciphers and error correction coding would have motivation to combine the above stated references.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Graunke et al (US 6947558) teaches a stream cipher method with a linear transformation.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Pyzocha whose telephone number is (571) 272-3875. The examiner

can normally be reached on 7:00am - 4:30pm first Fridays of the bi-week off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Emmanuel Moise can be reached on (571) 272-3865. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MJP

EMMANUEL L. MOISE
SUPERVISORY PATENT EXAMINER